Oregon Real-time GNSS Network Changes in 2024

2025 – PLSO/OGUG

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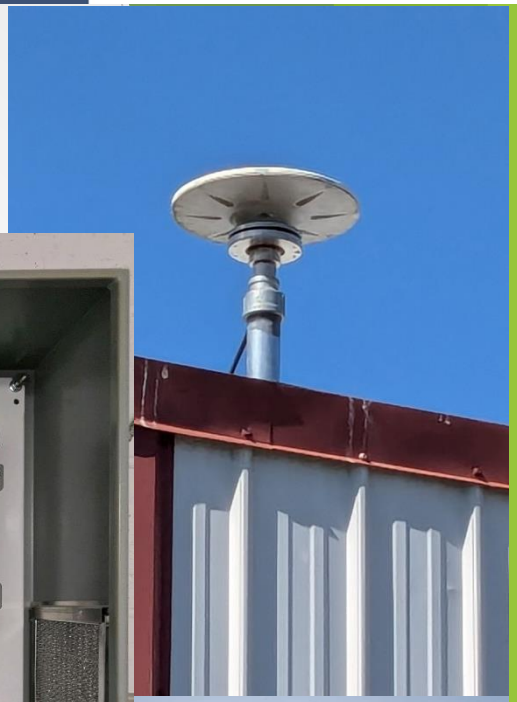
2024 Upgrades

Full GNSS

- **HALF** - Halfway
- **HRPR** - Harper
- **CRAN** - Crane
- **BRNT** - Unity

Equipment Provided by CWU



Earthscope

- P826 Astoria, replacement for TPW2

RINEX

- 1 sec RINEX products
  - 2.11
  - 3.04
  - Custom files by request

Full GNSS Upgrades Needed

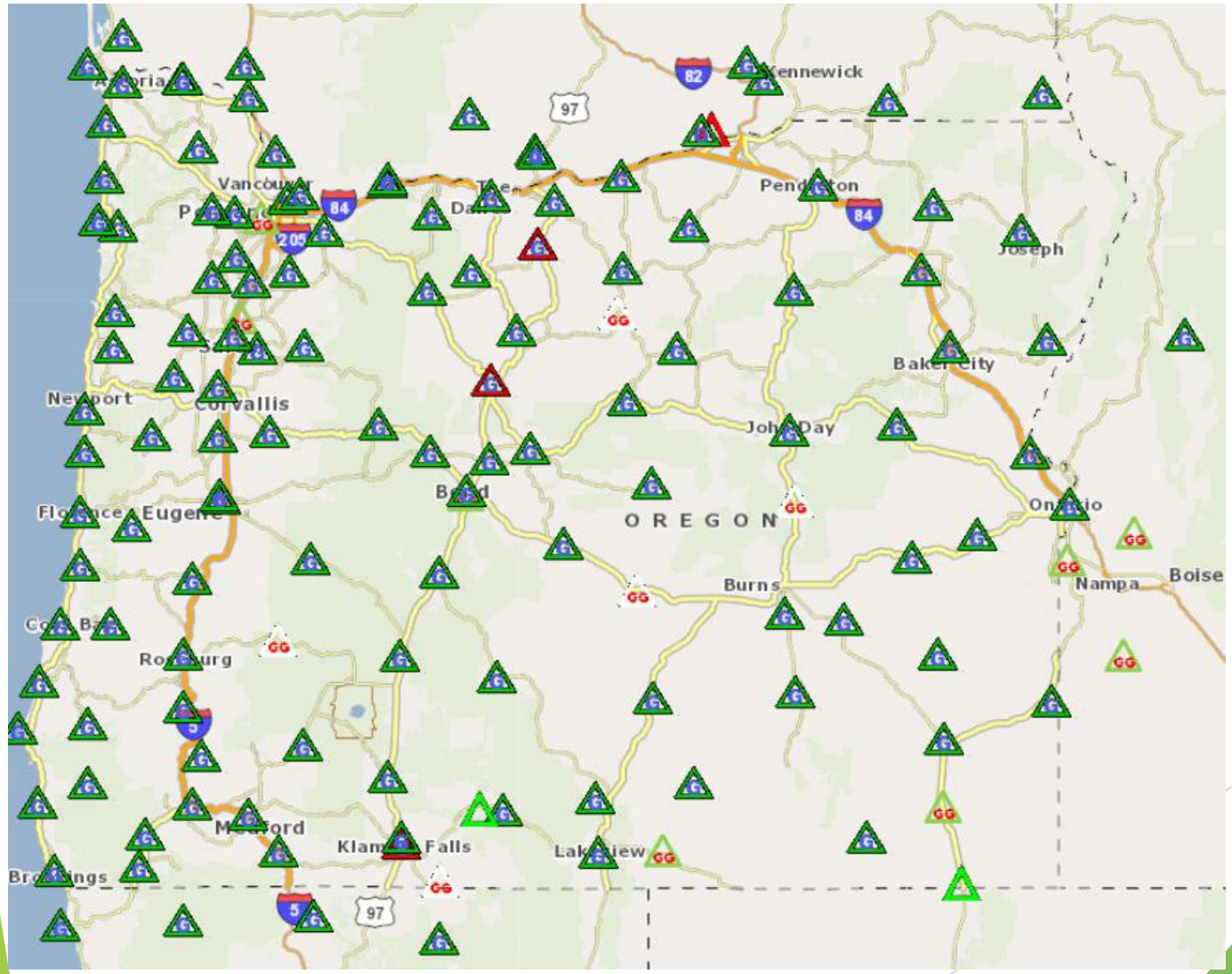
ODOT

- ADEL – Adel
- BASQ – Basque
- BEND – City of Bend??
- ~~BRNT – Burnt River School~~
- COBO – City of Beaverton
- ~~COND – Condon~~
- ~~CRAN – Crane~~
- ~~FWBD – Farewell Bend~~
- ~~GRAS – Grass Valley~~
- ~~HALF – Halfway~~
- ~~HRPR – Harper School~~
- JIME – ~~Upgraded by Washington County 2023~~
- MCSO – Salem
- ~~MTCL – Mitchell~~
- ~~SPRA – Spray~~
- ~~UKIA – Ukiah~~
- ~~WAMC – Wamic~~

PBO

- MDMT – Medicine Mountain
- P393 – Barren Valley
- P739 - McDermitt

Oregon Real-time GNSS Network



ORGN Stations Legend

Ground Station Status

- GNSS Active
- GNSS Alert
- GNSS Inactive
- GLONASS Active
- GLONASS Alert
- GLONASS Inactive
- GLONASS Planned
- GPS Active
- GPS Alert
- GPS Inactive
- GPS Planned

Coverage Area

- No Coverage
- Coverage

All Stations List+

(Coordinates & Links to Station Pages, Partners, RINEX data and Site Logs)

All Stations List							
August 19, 2024							
GNSS Legend GPS=GPSonly, GG= GPS+GLONASS, GNSS=GPS+GLONASS+Galileo							
Station ID	Ref ID	Location	Latitude	Longitude	Ellipsoid Height (meters) @ ARP	Site Logs	GNSS
ADEL	206	Adel	42 10 35.41966	-119 53 45.06314	1386.0970	ADEL	GG
AGNS	292	Agness	42 33 09.94155	-124 03 32.74455	51.763	AGNS	GNSS
ANAT	201	Anatone, WA	46 07 58.29503	-117 08 07.48104	1087.765	ANAT	GNSS
ARLN	202	Arlington	45 42 29.52532	-120 10 59.71154	120.812	ARLN	GNSS
ASHL	203	Ashland	42 10 50.47299	-122 40 12.55241	609.147	ASHL	GNSS
BASQ	270	Basque Maintenance Yard	42 24 41.76354	-117 51 46.84978	1349.14	BASQ	GG
BEND	205	Bend, City of	44 03 25.75727	-121 18 54.61222	1096.257	BEND	GG
BLY1	204	Bly	42 24 24.62755	-121 02 56.57650	1313.889	BLY1	GNSS
BNDM	278	Bend (ODOT Maintenance)	44 05 21.80729	-121 18 27.07883	1070.737	BNDM	GNSS
BRNT	222	Burnt River School (Unity)	44 26 24.77044	-118 11 28.69155	1213.201	BRNT	GNSS
		New Receiver 08/20/2024 Trimble NetR9					
BURN	271	Burns Jct	42 46 46.18843	-117 50 36.65278	1181.437	BURN	GNSS
CABL	243	Cape Blanco	42 50 09.94322	-124 33 47.98644	38.291	CABL	GNSS
CATH	207	Cathlamet, WA	46 11 50.27547	-123 22 02.11302	56.670	CATH	GNSS
CHEM	208	Chemult	43 13 27.68494	-121 47 08.94043	1440.413	CHEM	GNSS
CHZZ	256	Tillamook	45 29 11.44035	-123 58 41.18384	51.145	CHZZ	GNSS
COBO	209	Beaverton, City of	45 29 08.88914	-122 47 50.56291	47.207	COBO	GG
COND	210	Condon	45 14 16.44868	-120 10 52.90279	865.844	COND	GNSS
CRAN	213	CRAN-Crane	43 24 56.80137	-118 34 29.70705	1248.746	CRAN	GNSS
		New Antenna and Receiver 08/20/2024 Trimble TRM115000.00 NONE, NetR9					
CRLA	253	Crater Lake	42 53 44.91712	-122 08 10.07939	1952.636	N/A	GNSS
CROK	211	Castle Rock, WA	46 16 28.54446	-122 54 45.09357	1.470	CROK	GNSS
CTPT	212	Central Point	42 22 36.08473	-122 53 38.19500	370.975	CTPT	GNSS
DANP	247	Richland WA	46 16 48.13634	-119 16 34.52974	104.176	DANP	GNSS
DOWL	237	Eugene	44 03 57.45920	-123 05 53.27962	112.197	DOWL	GNSS
ELG2	341	Elgin	45 33 53.49145	-117 55 42.27526	816.489	ELG2	GNSS
ENTR	214	Enterprise	45 25 52.50655	-117 17 17.03741	1127.055	ENTR	GNSS
EUCH	250	Euchre Mtn	44 50 05.05549	-123 52 14.85766	722.265	EUCH	GNSS
FWBD	215	Farewell Bend POE	44 17 30.78145	-117 13 17.85372	631.934	FWBD	GNSS
GLWD	217	Glenwood , WA	46 01 11.36775	-121 17 18.92579	561.420	GLWD	GNSS
GOBS	200	Goldendale, WA	45 50 19.73131	-120 48 52.77605	621.955	GOBS	GNSS
GOLY	218	Goldendale, WA	45 49 43.29747	-120 48 08.78726	500.605	GOLY	GNSS
GRAS	219	Grass Valley (BLM)	45 21 51.87542	-120 47 14.62113	677.871	GRAS	GNSS
GTPS	220	Grants Pass	42 26 04.16523	-123 17 50.51054	279.017	GTPS	GNSS
HALF	221	Halfway	44 52 20.58922	-117 05 59.32893	783.937	HALF	GNSS
		New Antenna and Receiver 08/19/2024 Trimble TRM115000.00 NONE, NetR9					
HRPR	242	Harper School	43 51 57.12128	-117 36 28.54808	761.430	HRPR	GNSS
		New Receiver 08/20/2024 Trimble NetR9					
IDEM	249	Emmett, ID	43 51 53.55931	-116 28 31.62571	717.973	NA	GG
IDMU	243	Murphy, ID	43 13 00.30277	-116 33 03.77402	849.414	NA	GG
IDRO	248	Roswell, ID	43 43 22.35074	-116 57 44.84958	708.306	NA	GG
JIME	223	Hillsboro (Washington County	45 31 23.21435	-122 59 25.84156	53.404	JIME	GNSS
JUNT	226	Juntura	43 44 37.73932	-118 04 42.47825	891.128	JUNT	GNSS
KENI	224	Kennewick, WA	46 11 52.36515	-119 09 31.01667	146.534	KENI	GNSS
KFRC	225	Klamath Falls/ Rhine Cross	42 13 27.00263	-121 47 01.91272	1240.594	KFRC	GNSS

File Products (aka Correctors)

Three Ports

- **9879** – All single-base correctors by name: **GPS-only,** GG and **GNSS**.
- **9881-** Network (multi-base) & nearest-single-base correctors: all are **GPS-Only.**
- **9882** – Network (multi-base) & nearest-single-base correctors: all are GG (**GPS** and Glonass) and **GNSS**(**GPS,** Glonass and **Galileo**)

RT Products List

Single Base Corrector
Port 9879
January 19, 2024

Single Base Corrector	Location	Format	Port	Constellations
ANAT_Single_GG3x	ANATONE, WA	RTCM 3.x (Extended)	9879	G/R/-/-/-
ANAT_Single_GNSS	ANATONE, WA	RTCM 3.x (MSM4)	9879	G/R/E/C/J
ARLN_Single_GG3x	Arlington	RTCM 3.x (Extended)	9879	G/R/-/-/-
ARLN_Single_GNSS	Arlington	RTCM 3.x (MSM4)	9879	G/R/E/C/J
ASHL_Single_GG3x	Ashland	RTCM 3.x (Extended)	9879	G/R/-/-/-
ASHL_Single_GNSS	Ashland	RTCM 3.x (MSM4)	9879	G/R/E/C/J
BNDM_Single_GG3x	Bend Maintenance	RTCM 3.x (Extended)	9879	G/R/-/-/-
BNDM_Single_GNSS	Bend Maintenance	RTCM 3.x (MSM4)	9879	G/R/E/C/J
BRNT_Single_GG3x	Unity	RTCM 3.x (Extended)	9879	G/R/-/-/-
CABL_Single_GG3x	Cape Blanco	RTCM 3.x (Extended)	9879	G/R/-/-/-
CATH_GNSS	Cathlamet	RTCM 3.x (MSM4)	9879	G/R/E/-/-
CATH_Single_GG3x	Cathlamet	RTCM 3.x (Extended)	9879	G/R/-/-/-
COBO_Single_GG3x	City of Beaverton	RTCM 3.x (Extended)	9879	G/R/-/-/-
CRAN_Single_GG3x	Crane	RTCM 3.x (Extended)	9879	G/R/-/-/-
CRLA_Single_GG3x	Crater Lake	RTCM 3.x (Extended		
CROK_Single_3x	Castle RocK WA	RTCM 3.x (Extended		
CROK_Single_GG3x	Castle RocK WA	RTCM 3.x (Extended		
CTPT_Single_GG3x	Central Point	RTCM 3.x (Extended		
DANP_Single	RICHLAND WA	RTCM 2.x (Type 1;2;1		
DANP_Single_GNSS	RICHLAND WA	RTCM 3.x (MSM4)		
ENTR_Single	Enterprise	RTCM 2.x (Type 1;2;1		
ENTR_Single_GG3x	Enterprise	RTCM 3.x (Extended		
GLWD_Single_GG3x	Glenwood WA	RTCM 3.x (Extended		
GOLY_Single_GG3x	GOLDENDALE WA	RTCM 3.x (Extended		
GTPS_Single_GG3x	Grants Pass	RTCM 3.x (Extended		
HALF_Single_GG3x	Halfway	RTCM 3.x (Extended		
HRPR_Single_GG3x	Harper	RTCM 3.x (Extended		
JIME_Single_GG3x	Washington County	RTCM 3.x (Extended		
JUNT_Single_GG3x	Juntura	RTCM 3.x (Extended		
KENI_Single_GG3x	Kennewick WA	RTCM 3.x (Extended		
LCS1_GNSS	Albany	RTCM 3.x (MSM4)		
LCS1_Single	Albany	RTCM 3.x (Extended		
LCS1_Single_GG3x	Albany	RTCM 3.x (Extended		

GPS Only Network Corrector
Port 9881
January 19, 2024

Network Corrector	Format	Port
IMAX_CMR_AG	i-MAX CMR+	9881
IMAX_CMR+	i-MAX CMR+	9881
IMAX_RTCM3	i-MAX RTCM 3.x (Extended)	9881
IMAX_RTCM3_AG	i-MAX RTCM 3.x (Extended)	9881
MAX_RTCM3	MAX RTCM 3.x (Extended;1015;1016)	9881
Nearest_Single_RTCM3	RTCM 3.x (Extended)	9881

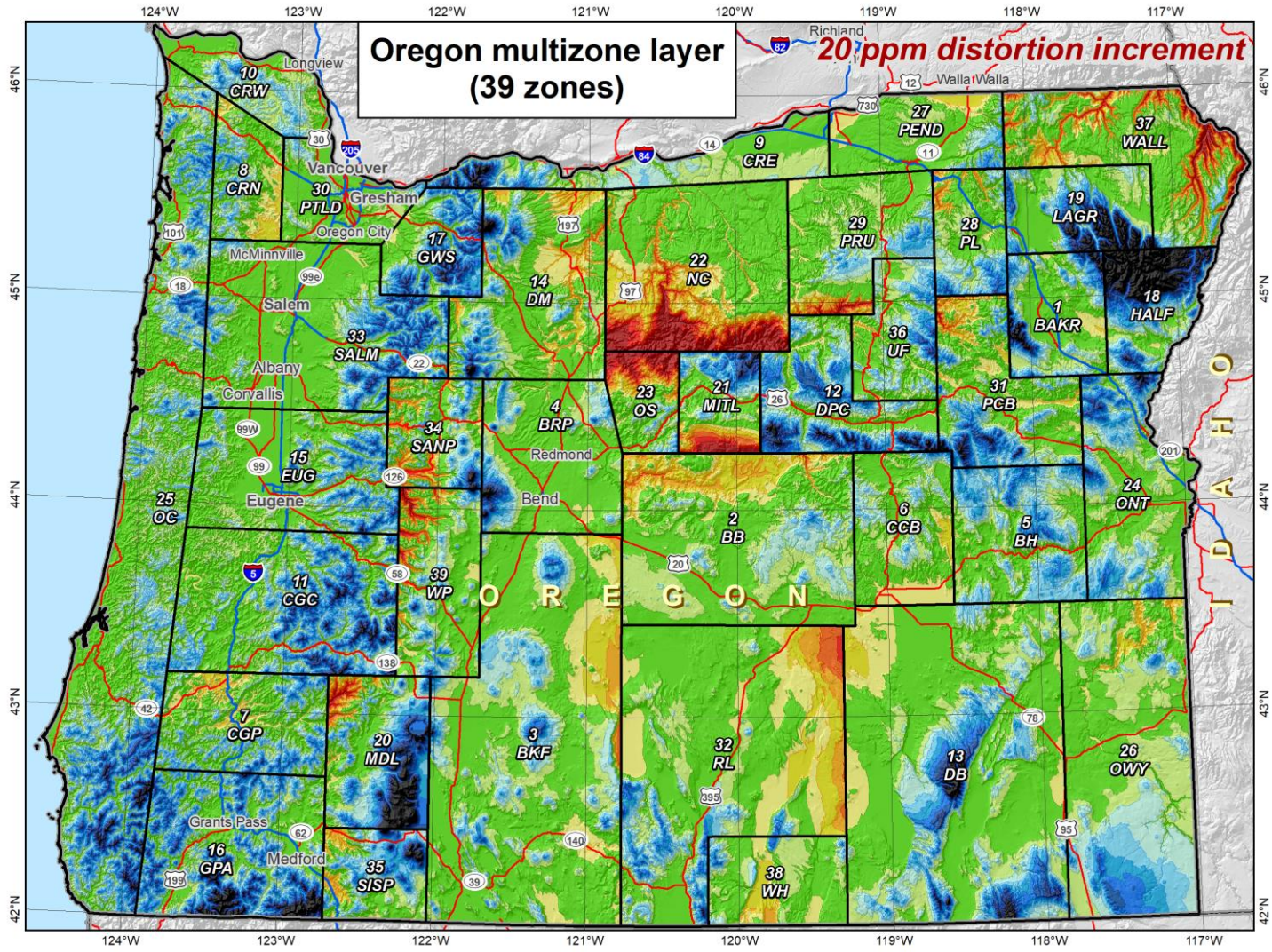
GNSS Network Corrector
Port 9882
January 19, 2024

Network Corrector	Format	Port	Constellations
GIS_Nearest	RTCM 3.x (Extended)	9882	G/R/-/-/-
IMAX_GG_CMR	i-MAX CMR+	9882	G/R/-/-/-
IMAX_GG_CMR_AG	i-MAX CMR+	9882	G/R/-/-/-
IMAX_GG_RTCM3	i-MAX RTCM 3.x (Extended)	9882	G/R/-/-/-
IMAX_GG_RTCM3_AG	i-MAX RTCM 3.x (Extended)	9882	G/R/-/-/-
IMAX_GNSS	i-MAX RTCM 3.x (MSM4)	9882	G/R/E/-/-
IMAX_GNSS_AG	i-MAX RTCM 3.x (MSM4)	9882	G/R/E/-/-
IMAX_GNSS5	i-MAX RTCM 3.x (MSM5)	9882	G/R/E/-/-
MAX_GG_RTCM3	MAX RTCM 3.x (Extended;1015;1016)	9882	G/R/-/-/-
MAX_GG_RTCM3_AG	MAX RTCM 3.x (Extended;1015;1016)	9882	G/R/-/-/-
Nearest_Single_GG_RTCM3	RTCM 3.x (Extended)	9882	G/R/-/-/-
Nearest_Single_GNSS	RTCM 3.x (MSM4)	9882	G/R/E/-/-

Advantages and Cautions

Changes in 2025?

- NSRS (NATRF2022)?
- New Coordinates (SPCS2022?
- GNSS equip. upgrade
- New Station at Merrill
- New location for station DOWL (in Eugene)
- Replace ftp server?



Preliminary SPCS2022 *(as submitted 2/23/2021)*

North American Terrestrial Reference Frame of 2022

Distortion statistics (ppm)

Mean weighted by population -2		Cities	Area
	Min	-129	-373
	Max	+186	+241
	Range	315	614
	Mean	+7	-22

Percent in distortion range (ppm)

Range ±26	Population 93%	Cities 86%	Area 50%
±10	77%	67%	25%
±20	90%	81%	42%
±30	95%	88%	55%
±40	97%	92%	66%
±50	98.7%	96%	73%
±75	99.6%	97.6%	86%
±100	99.9%	98.4%	92%
±150	99.98%	99.6%	98%
±200	100%	100%	99.5%
±300	100%	100%	99.97%
±400	100%	100%	100%
±500	100%	100%	100%

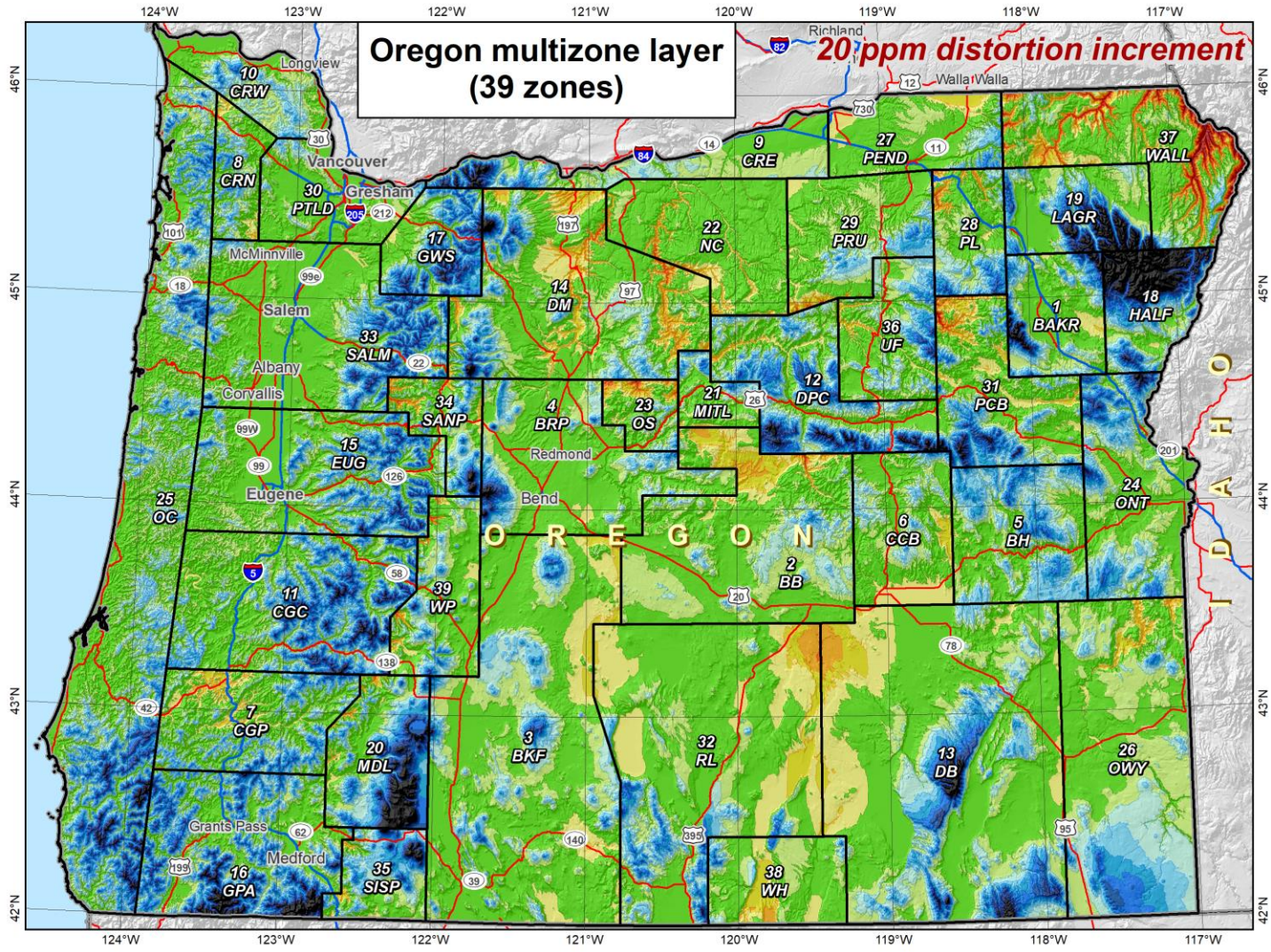
Linear distortion at topographic surface (parts per million, ppm)

<-160	to -80	to +60
to -160	to -60	to +80
to -140	to -40	to +100
to -120	±20	to +120
to -100	to +40	>+120

0 50 100 km

Created 4/12/2024 (Michael Dennis)

NOAA's National Geodetic Survey



Preliminary SPCS2022 *(revised 4/15/2024)*

North American Terrestrial Reference Frame of 2022

Distortion statistics (ppm)

Mean weighted by population -2		Cities	Area
	Min	-129	-373
	Max	+112	+222
	Range	241	595
	Mean	+4	-26

Percent in distortion range (ppm)

Range	Population	Cities	Area
±25	**94%**	**87%**	**50%**
±10	80%	70%	26%
±20	92%	83%	43%
±30	96%	90%	57%
±40	98%	94%	68%
±50	99.1%	98%	75%
±75	99.8%	99%	87%
±100	99.9%	99%	93%
±150	99.98%	100%	98%
±200	100%	100%	99.5%
±300	100%	100%	99.97%
±400	100%	100%	100%
±500	100%	100%	100%

Linear distortion at topographic surface (parts per million, ppm)

<-160	to -80	to +60
to -160	to -60	to +80
to -140	to -40	to +100
to -120	±20	to +120
to -100	to +40	>+120

0 50 100 km

Created 4/15/2024 (Michael Dennis)

NOAA's National Geodetic Survey

Questions?

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Oregon Real-time GNSS Network
https://www.oregon.gov/odot/orgn/pages/index.aspx